

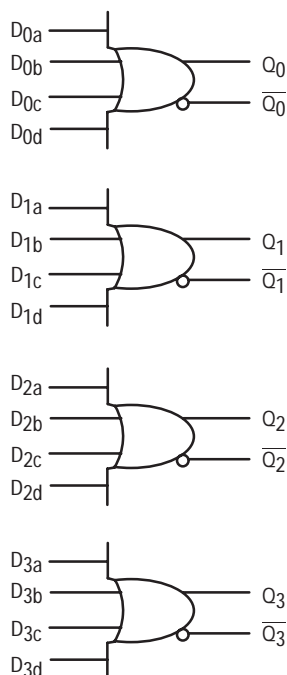
# MC10EP101

## Quad 4-Input OR/NOR

The MC10EP101 is a Quad 4-input OR/NOR gate. The device is functionally equivalent to the E101. With AC performance faster than the E101 device, the EP101 is ideal for applications requiring the fastest AC performance available. All VCC and VEE pins must be externally connected to power supply to guarantee proper operation.

- 250ps Typical Propagation Delay
- High Bandwidth to 3 Ghz Typical
- PECL mode: 3.0V to 5.5V VCC with VEE = 0V
- ECL mode: 0V VCC with VEE = -3.0V to -5.5V
- 75kΩ Internal Input Pulldown Resistors
- ESD Protection: >4KV HBM, >100V MM
- Moisture Sensitivity Level 2
- For Additional Information, See Application Note AND8003/D
- Flammability Rating: UL-94 code V-0 @ 1/8", Oxygen Index 28 to 34
- Transistor Count = 173 devices

### LOGIC DIAGRAM



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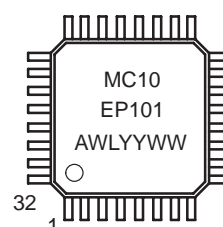


**32-LEAD TQFP**

**FA SUFFIX**

**CASE 873A**

### MARKING DIAGRAM\*



A = Assembly Location  
WL = Wafer Lot  
YY = Year  
WW = Work Week

\*For additional information, see Application Note AND8002/D

### PIN DESCRIPTION

PIN	FUNCTION
D0a–D3d	ECL Data Inputs
Q0–Q3, Q0–Q3	ECL Data Outputs
VCC	Positive Supply
VBB	Reference Voltage Output
VEE	Negative, 0 Supply

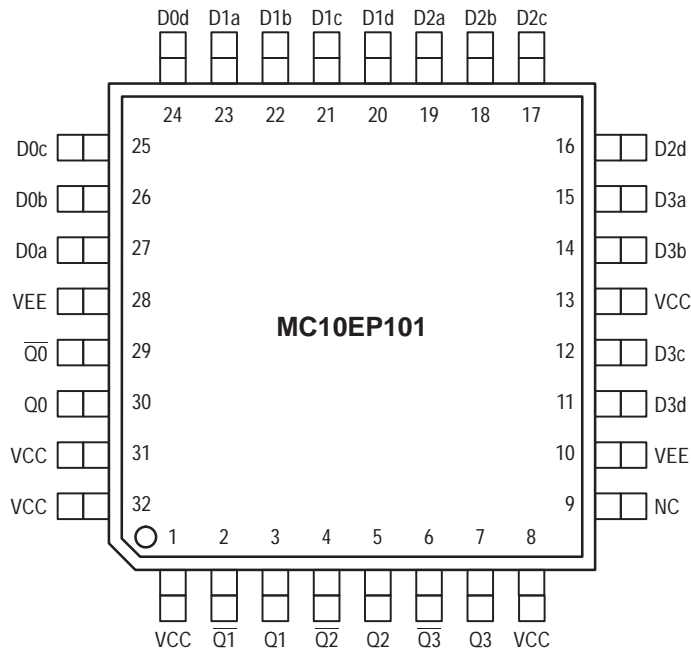
### TRUTH TABLE

Dna	Dnb	Dnc	Dnd	Qn	Qn
L	L	L	L	L	H
H	X	X	X	H	L
X	H	X	X	H	L
X	X	H	X	H	L
X	X	X	H	H	L
H	H	H	H	H	L

### ORDERING INFORMATION

Device	Package	Shipping
MC10EP101FA	TQFP	250 Units/Tray
MC10EP101FAR2	TQFP	2000 Tape & Reel

# MC10EP101



**Figure 1. 32-Lead TQFP Pinout**  
(Top View)

Warning: All  $V_{CC}$  and  $V_{EE}$  pins must be externally connected to Power Supply to guarantee proper operation.

## MAXIMUM RATINGS\*

Symbol	Parameter	Value	Unit
V <sub>EE</sub>	Power Supply (V <sub>CC</sub> = 0V)	−6.0 to 0	VDC
V <sub>CC</sub>	Power Supply (V <sub>EE</sub> = 0V)	6.0 to 0	VDC
V <sub>I</sub>	Input Voltage (V <sub>CC</sub> = 0V, V <sub>I</sub> not more negative than V <sub>EE</sub> )	−6.0 to 0	VDC
V <sub>I</sub>	Input Voltage (V <sub>EE</sub> = 0V, V <sub>I</sub> not more positive than V <sub>CC</sub> )	6.0 to 0	VDC
I <sub>out</sub>	Output Current Continuous Surge	50 100	mA
T <sub>A</sub>	Operating Temperature Range	−40 to +85	°C
T <sub>stg</sub>	Storage Temperature	−65 to +150	°C
θ <sub>JA</sub>	Thermal Resistance (Junction-to-Ambient) Still Air 500lfpm	80 55	°C/W
θ <sub>JC</sub>	Thermal Resistance (Junction-to-Case)	12 to 17	°C/W
T <sub>sol</sub>	Solder Temperature (<2 to 3 Seconds: 245°C desired)	265	°C

\* Maximum Ratings are those values beyond which damage to the device may occur.

# MC10EP101

## DC CHARACTERISTICS, ECL/LVECL ( $V_{CC} = 0V$ , $V_{EE} = -5.5V$ to $-3.0V$ ) (Note 3.)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
IEE	Power Supply Current (Note 1.)	45	57	75	45	58	75	45	59	75	mA
VOH	Output HIGH Voltage (Note 2.)	-1135	-1060	-885	-1070	-945	-820	-1010	-885	-760	mV
VOL	Output LOW Voltage (Note 2.)	-1995	-1810	-1685	-1995	-1745	-1620	-1995	-1685	-1560	mV
VIH	Input HIGH Voltage Single Ended	-1210		-885	-1145		-820	-1085		-760	mV
VIL	Input LOW Voltage Single Ended	-1935		-1610	-1870		-1545	-1810		-1485	mV
I <sub>IH</sub>	Input HIGH Current			150			150			150	μA
I <sub>IL</sub>	Input LOW Current	-150			-150			-150			μA

NOTE: 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained.

1.  $V_{CC} = 0V$ ,  $V_{EE} = V_{EEmin}$  to  $V_{EEmax}$ , all other pins floating.
2. All loading with 50 ohms to  $V_{CC} - 2.0$  volts.
3. Input and output parameters vary 1:1 with  $V_{CC}$ .

## DC CHARACTERISTICS, LVPECL ( $V_{CC} = 3.3V \pm 0.3V$ , $V_{EE} = 0V$ ) (Note 6.)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
IEE	Power Supply Current (Note 4.)	45	57	75	45	58	75	45	59	75	mA
VOH	Output HIGH Voltage (Note 5.)	2165	2240	2415	2230	2355	2480	2290	2415	2540	mV
VOL	Output LOW Voltage (Note 5.)	1305	1490	1615	1305	1555	1680	1305	1615	1740	mV
VIH	Input HIGH Voltage Single Ended	2090		2415	2155		2480	2215		2540	mV
VIL	Input LOW Voltage Single Ended	1365		1690	1430		1755	1490		1815	mV
I <sub>IH</sub>	Input HIGH Current			150			150			150	μA
I <sub>IL</sub>	Input LOW Current	-150			-150			-150			μA

NOTE: 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained.

4.  $V_{CC} = 3.0V$ ,  $V_{EE} = 0V$ , all other pins floating.
5. All loading with 50 ohms to  $V_{CC} - 2.0$  volts.
6. Input and output parameters vary 1:1 with  $V_{CC}$ .

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## DC CHARACTERISTICS, PECL ( $V_{CC} = 5.0V \pm 0.5V$ , $V_{EE} = 0V$ ) (Note 9.)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
IEE	Power Supply Current (Note 7.)	45	57	75	45	58	75	45	59	75	mA
VOH	Output HIGH Voltage (Note 8.)	3865	3940	4115	3930	4055	4180	3990	4115	4240	mV
VOL	Output LOW Voltage (Note 8.)	3005	3190	3315	3005	3255	3380	3005	3315	3440	mV
VIH	Input HIGH Voltage Single Ended	3790		4115	3855		4180	3915		4240	mV
VIL	Input LOW Voltage Single Ended	3065		3390	3130		3455	3190		3515	mV
I <sub>IH</sub>	Input HIGH Current			150			150			150	μA
I <sub>IL</sub>	Input LOW Current	-150			-150			-150			μA

NOTE: 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained.

7.  $V_{CC} = 5.0V$ ,  $V_{EE} = 0V$ , all other pins floating.

8. All loading with 50 ohms to  $V_{CC} - 2.0$  volts.

9. Input and output parameters vary 1:1 with  $V_{CC}$ .

## AC CHARACTERISTICS ( $V_{CC} = 3.0V$ to $5.5V$ ; $V_{EE} = 0V$ ) or ( $V_{CC} = 0V$ ; $V_{EE} = -3.0V$ to $-5.5V$ )

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f <sub>max</sub>	Maximum Toggle Frequency (Note 10.)		3.0			3.0			3.0		GHz
t <sub>PLH</sub> , t <sub>PHL</sub>	Propagation Delay D → Q, $\overline{Q}$	125	225	325	150	250	370	170	300	420	ps
t <sub>SKEW</sub>	Device Skew Part-to-Part (Note 11.) Q, $\overline{Q}$		TBD TBD			TBD TBD			TBD TBD		ps
t <sub>JITTER</sub>	Cycle-to-Cycle Jitter		TBD			TBD			TBD		ps
t <sub>r</sub> t <sub>f</sub>	Output Rise and Fall Times (20% – 80%) Q, $\overline{Q}$	100	150	200	100	170	250	120	190	270	ps

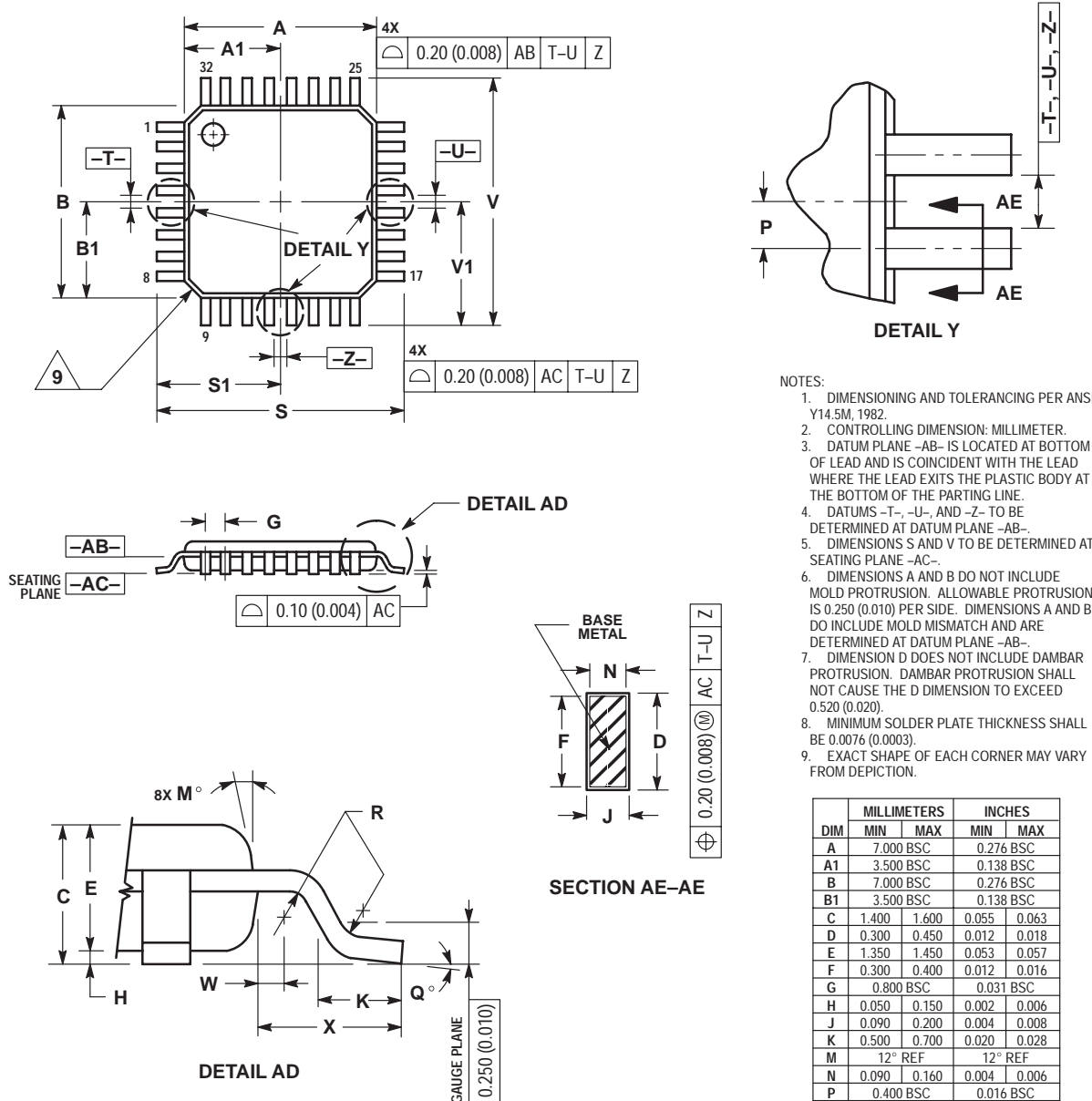
10. F<sub>max</sub> guaranteed for functionality only.

11. Skew is measured between outputs under identical transitions.

# MC10EP101

## PACKAGE DIMENSIONS


TQFP  
FA SUFFIX  
32-LEAD PLASTIC PACKAGE  
CASE 873A-02  
ISSUE A



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.000 BSC		0.276 BSC	
A1	3.500 BSC		0.138 BSC	
B	7.000 BSC		0.276 BSC	
B1	3.500 BSC		0.138 BSC	
C	1.400	1.600	0.055	0.063
D	0.300	0.450	0.012	0.018
E	1.350	1.450	0.053	0.057
F	0.300	0.400	0.012	0.016
G	0.800 BSC		0.031 BSC	
H	0.050	0.150	0.002	0.006
J	0.090	0.200	0.004	0.008
K	0.500	0.700	0.020	0.028
M	12° REF		12° REF	
N	0.090	0.160	0.004	0.006
P	0.400 BSC		0.016 BSC	
Q	1°	5°	1°	5°
R	0.150	0.250	0.006	0.010
S	9.000 BSC		0.354 BSC	
S1	4.500 BSC		0.177 BSC	
V	9.000 BSC		0.354 BSC	
V1	4.500 BSC		0.177 BSC	
W	0.200 REF		0.008 REF	
X	1.000 REF		0.039 REF	

## **Notes**

## **Notes**

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